CLAIMS

I/WE CLAIM:

1. A bandwidth meter for measuring the bandwidth of a spectrum of light emitted from a laser input to the bandwidth meter comprising:

a first optical bandwidth detector providing a first output representative of a parameter which is indicative of the bandwidth of the light emitted from the laser as actually measured by the first bandwidth detector;

a second optical bandwidth detector providing a second output representative of a parameter which is indicative of bandwidth of the light emitted from the laser as actually measured by the second bandwidth detector; and,

an actual bandwidth calculation apparatus adapted to utilize the first output and the second output as part of a multivariable linear equation employing predetermined calibration variables specific to either the first bandwidth detector or the second bandwidth detector, to calculate an actual bandwidth parameter.

2. The apparatus of claim 1 further comprising:

the actual bandwidth parameter is a spectrum full width at some percent of the maximum within the full width of the spectrum of light emitted from the laser ("FWXM").

3. The apparatus of claim 1, further comprising:

the actual bandwidth parameter is a width between two points on the spectrum defining a content of the spectrum containing some percentage of the energy of the full spectrum of the spectrum of light emitted from the laser ("EX").

4. The apparatus of claim 1 further comprising:

the first bandwidth detector is an etalon and the first output is representative of a fringe width of a fringe of an optical output of the etalon at FWXM; and,

the second bandwidth detector is an etalon and the second output is representative of a fringe width of an optical output of the etalon at FWXM.

5. The apparatus of claim 2 further comprising:

the first bandwidth detector is an etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at FWXM, and,

the second bandwidth detector is an etalon and the second output is a fringe width of an optical output of the etalon at FWXM.

6. The apparatus of claim 3 further comprising:

the first bandwidth detector is an etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at FWXM; and,

the second bandwidth detector is an etalon and the second output is a fringe width of an optical output of the etalon at FWXM.

7. The apparatus of claim 1, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of a first actual bandwidth parameter and of a second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of a first actual bandwidth parameter and of a second actual bandwidth parameter.

8. The apparatus of claim 2, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of a first actual bandwidth parameter and of a second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

9. The apparatus of claim 3, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

10. The apparatus of claim 4, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

11. The apparatus of claim 5, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

12. The apparatus of claim 6, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot

representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

13. The apparatus of claim 7, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

14. The apparatus of claim 8, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

15. The apparatus of claim 9, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

16. The apparatus of claim 10, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

17. The apparatus of claim 11, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

18. The apparatus of claim 12, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

19. The apparatus of claim 13, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

20. The apparatus of claim 14, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

21. The apparatus of claim 15, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

22. The apparatus of claim 16, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

23. The apparatus of claim 17, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

24. The apparatus of claim 18, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

25. The apparatus of claim 19, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

26. The apparatus of claim 20, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

27. The apparatus of claim 21, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

28. The apparatus of claim 22, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

29. The apparatus of claim 23, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

30. The apparatus of claim 24, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

31. The apparatus of claim 19, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

32. The apparatus of claim 20, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

33. The apparatus of claim 21, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

34. The apparatus of claim 22, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

35. The apparatus of claim 23, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

36. The apparatus of claim 24, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

37. A photolithography light source comprising:

a laser light source; and,

a bandwidth meter for measuring the bandwidth of a spectrum of light emitted from the laser input to the bandwidth meter comprising:

a first wavelength sensitive optical bandwidth detector providing a first output representative of a first parameter which is indicative of the bandwidth of the light emitted from the laser as actually measured by the first bandwidth detector;

a second wavelength sensitive optical bandwidth detector providing a second output representative of the first parameter which is indicative of bandwidth of the light emitted from the laser as actually measured by the second bandwidth detector; and,

an actual bandwidth calculation apparatus adapted to utilize the first output and the second output as part of a multivariable linear equation employing predetermined calibration variables specific to either the first bandwidth detector or the second bandwidth detector, to calculate a first actual bandwidth parameter or a second actual bandwidth parameter for the light emitted from the laser.

38. The apparatus of claim 37 further comprising:

the first actual bandwidth parameter is a spectrum full width at some percent of the maximum within the full width of the spectrum of light emitted from the laser ("FWXM").

39. The apparatus of claim 37, further comprising:

the second actual bandwidth parameter is a width between two points on the spectrum defining a content of the spectrum containing some percentage of the energy of the full spectrum of the spectrum of light emitted from the laser ("EX").

40. The apparatus of claim 37 further comprising:

the first bandwidth detector is and etalon and the first output is representative of a fringe width of a fringe of an optical output of the etalon at FWXM; and,

the second bandwidth detector is an etalon and the second output is representative of a fringe width of an optical output of the etalon at FWXM.

41. The apparatus of claim 38 further comprising:

the first bandwidth detector is and etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at FWXM, and,

the second bandwidth detector is an etalon and the second output is a fringe width of an optical output of the etalon at FWXM.

42. The apparatus of claim 39 further comprising:

the first bandwidth detector is and etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at FWXM; and,

the second bandwidth detector is an etalon and the second output is a fringe width of an optical output of the etalon at FWXM.

43. The apparatus of claim 37, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

44. The apparatus of claim 38, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a

calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

45. The apparatus of claim 39, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

46. The apparatus of claim 40, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

47. The apparatus of claim 41, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a

calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

48. The apparatus of claim 42, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

49. The apparatus of claim 43, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

50. The apparatus of claim 44, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

51. The apparatus of claim 45, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

52. The apparatus of claim 46, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

53. The apparatus of claim 47, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

54. The apparatus of claim 48, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

55. The apparatus of claim 49, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

56. The apparatus of claim 50, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

57. The apparatus of claim 51, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

58. The apparatus of claim 52, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

59. The apparatus of claim 53, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

60. The apparatus of claim 54, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

61. The apparatus of claim 55, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

62. The apparatus of claim 56, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

63. The apparatus of claim 57, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

64. The apparatus of claim 58, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

65. The apparatus of claim 59, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

66. The apparatus of claim 60, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

67. The apparatus of claim 55, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

68. The apparatus of claim 56, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

69. The apparatus of claim 57, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

70. The apparatus of claim 58, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second

optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

71. The apparatus of claim 59, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

72. The apparatus of claim 60, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

73. A photolithography tool comprising:

a photolithography light source comprising:

a bandwidth meter for measuring the bandwidth of a spectrum of light emitted from a laser input to the bandwidth meter comprising:

a first wavelength sensitive optical bandwidth detector providing a first output representative of a first parameter which is indicative of the bandwidth of the light emitted from the laser as actually measured by the first bandwidth detector;

a second wavelength sensitive optical bandwidth detector providing a second output representative of the first parameter which is indicative of bandwidth of the light emitted from the laser as actually measured by the second bandwidth detector; and,

an actual bandwidth calculation apparatus adapted to utilize the first output and the second output as part of a multivariable linear equation employing predetermined calibration variables specific to either the first bandwidth detector or the second bandwidth detector, to calculate a first actual bandwidth parameter or a second actual bandwidth parameter for the light emitted from the laser.

74. The apparatus of claim 73 further comprising:

the first actual bandwidth parameter is a spectrum full width at some percent of the maximum within the full width of the spectrum of light emitted from the laser ("FWXM").

75. The apparatus of claim 73, further comprising:

the second actual bandwidth parameter is a width between two points on the spectrum defining a content of the spectrum containing some percentage of the energy of the full spectrum of the spectrum of light emitted from the laser ("EX").

76. The apparatus of claim 73 further comprising:

the first bandwidth detector is and etalon and the first output is representative of a fringe width of a fringe of an optical output of the etalon at FWXM; and,

the second bandwidth detector is an etalon and the second output is representative of a fringe width of an optical output of the etalon at FWXM.

77. The apparatus of claim 74 further comprising:

the first bandwidth detector is and etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at FWXM, and,

the second bandwidth detector is an etalon and the second output is a fringe width of an optical output of the etalon at FWXM.

78. The apparatus of claim 75 further comprising:

the first bandwidth detector is and etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at FWXM; and,

the second bandwidth detector is an etalon and the second output is a fringe width of an optical output of the etalon at FWXM.

79. The apparatus of claim 73, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

80. The apparatus of claim 74, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

81. The apparatus of claim 75, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

82. The apparatus of claim 76, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot

representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

83. The apparatus of claim 77, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

84. The apparatus of claim 78, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

85. The apparatus of claim 79, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

86. The apparatus of claim 80, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

87. The apparatus of claim 81, further comprising:

the first actual bandwidth parameter is a spectrum FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

88. The apparatus of claim 82, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

89. The apparatus of claim 83, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

90. The apparatus of claim 84, further comprising:

the first actual bandwidth parameter is a spectrum FWHM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

91. The apparatus of claim 85, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

92. The apparatus of claim 86, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

93. The apparatus of claim 87, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

94. The apparatus of claim 88, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

95. The apparatus of claim 89, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

96. The apparatus of claim 90, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM)) + (b* (calibrating input light known value of EX) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

97. The apparatus of claim 91, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

98. The apparatus of claim 92, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

99. The apparatus of claim 93, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

100. The apparatus of claim 94, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

101. The apparatus of claim 95, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

102. The apparatus of claim 96, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

103. The apparatus of claim 97, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

104. The apparatus of claim 98, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

105. The apparatus of claim 99, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

106. The apparatus of claim 100, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

107. The apparatus of claim 101, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

108. The apparatus of claim 102, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to FWXM than to EX and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to EX than to FWXM.

109. A bandwidth measuring means for measuring the bandwidth of a spectrum of light emitted from a laser input to the bandwidth measuring means comprising:

a first wavelength sensitive optical bandwidth detector means for providing a first output representative of a first parameter which is indicative of the bandwidth of the light emitted from the laser as actually measured by the first bandwidth detector means;

a second wavelength sensitive optical bandwidth detector means for providing a second output representative of a first parameter which is indicative of bandwidth of the light emitted from the laser as actually measured by the second bandwidth detector means; and,

an actual bandwidth calculation means for, utilizing the first output and the second output as part of a multivariable linear equation employing precomputed calibration variables specific to either the first bandwidth detector means or the second bandwidth detector means, calculating a first actual bandwidth parameter or a second actual bandwidth parameter for the light emitted from the laser.

110. The apparatus of claim 109 further comprising:

the first actual bandwidth parameter is a FWXM of the spectrum of light emitted from the laser.

111. The apparatus of claim 109, further comprising:

the second actual bandwidth parameter is an EX the spectrum of light emitted from the laser.

112. The apparatus of claim 109 further comprising:

the first bandwidth detector means is an etalon and the first output is representative of a fringe width of a fringe of an optical output of the etalon at some percent of the maximum within the full width of the first output; and,

the second bandwidth detector means is an etalon and the second output is representative of a fringe width of an optical output of the etalon at some percent of the maximum within the full width of the second output.

113. The apparatus of claim 110 further comprising:

the first bandwidth detector means is an etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at some percent of the maximum within the full width of the first output; and,

the second bandwidth detector means is an etalon and the second output is a fringe width of an optical output of the etalon at some percent of the maximum within the full width of the second output.

114. The apparatus of claim 111 further comprising:

the first bandwidth detector means is and etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at some percent of the maximum within the full width of the first output; and,

the second bandwidth detector means is an etalon and the second output is a fringe width of an optical output of the etalon at some percent of the maximum within the full width of the second output.

115. The apparatus of claim 109, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

116. The apparatus of claim 110, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

117. The apparatus of claim 111, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

118. The apparatus of claim 112, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

119. The apparatus of claim 113, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

120. The apparatus of claim 114, further comprising:

the precomputed calibration variables are derived from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot

representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

121. The apparatus of claim 115, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

122. The apparatus of claim116, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

123. The apparatus of claim 117, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

124. The apparatus of claim 118, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

125. The apparatus of claim 119, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

126. The apparatus of claim 120, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

127. The apparatus of claim 121, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

128. The apparatus of claim 122, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

129. The apparatus of claim 123, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

130. The apparatus of claim 124, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

131. The apparatus of claim 125, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

132. The apparatus of claim 126, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

133. The apparatus of claim 127, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

134. The apparatus of claim 128, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

135. The apparatus of claim 129, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

136. The apparatus of claim 130, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

137. The apparatus of claim 131, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

138. The apparatus of claim 132, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

139. The apparatus of claim 133, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

140. The apparatus of claim 134, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

141. The apparatus of claim 135, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

142. The apparatus of claim 136, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

143. The apparatus of claim 137, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

144. The apparatus of claim 138, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the

content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

145. A bandwidth measuring method for measuring the bandwidth of a spectrum of light emitted from a laser comprising:

utilizing a first wavelength sensitive optical bandwidth detector to provide a first output representative of a first parameter which is indicative of the bandwidth of the light emitted from the laser as actually measured by the first bandwidth detector;

utilizing a second wavelength sensitive optical bandwidth detector to provide a second output representative of a first parameter which is indicative of bandwidth of the light emitted from the laser as actually measured by the second bandwidth detector; and,

utilizing an actual bandwidth calculation device, utilizing the first output and the second output as part of a multivariable linear equation employing precomputed calibration variables specific to either the first bandwidth detector or the second bandwidth detector, to calculate a first actual bandwidth parameter or a second actual bandwidth parameter for the light emitted from the laser.

146. The method of claim 145 further comprising:

the first actual bandwidth parameter is a FWXM of the spectrum of light emitted from the laser.

147. The method of claim 145, further comprising:

the second actual bandwidth parameter is an EX the spectrum of light emitted from the laser.

148. The method of claim 145 further comprising:

the first bandwidth detector means is an etalon and the first output is representative of a fringe width of a fringe of an optical output of the etalon at some percent of the maximum within the full width of the first output; and,

the second bandwidth detector means is an etalon and the second output is representative of a fringe width of an optical output of the etalon at some percent of the maximum within the full width of the second output.

149. The method of claim 146 further comprising:

the first bandwidth detector means is an etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at some percent of the maximum within the full width of the first output; and,

the second bandwidth detector means is an etalon and the second output is a fringe width of an optical output of the etalon at some percent of the maximum within the full width of the second output.

150. The method of claim 147 further comprising:

the first bandwidth detector means is and etalon and the first output representative of a fringe width of a fringe of an optical output of the etalon at some percent of the maximum within the full width of the first output; and,

the second bandwidth detector means is an etalon and the second output is a fringe width of an optical output of the etalon at some percent of the maximum within the full width of the second output.

151. The method of claim 145, further comprising:

deriving the precomputed calibration variables from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

152. The method of claim 146, further comprising:

deriving the precomputed calibration variables from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

153. The method of claim 147, further comprising:

deriving the precomputed calibration variables from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

154. The method of claim 112, further comprising:

deriving the precomputed calibration variables from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

155. The method of claim 149, further comprising:

deriving the precomputed calibration variables from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a

calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

156. The method of claim 150, further comprising:

deriving the precomputed calibration variables from a three dimensional plot representing the first output of the first bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter, and from a three dimensional plot representing the second output of the second bandwidth detector means in relation to a calibrating input light with known values of the first actual bandwidth parameter and of the second actual bandwidth parameter.

157. The method of claim 151, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

158. The method of claim152, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

159. The method of claim 153, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

160. The method of claim 154, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

161. The method of claim 155, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

162. The method of claim 156, further comprising:

the first actual bandwidth parameter is an FWXM of the spectrum of light emitted from the laser; and,

the second actual bandwidth parameter is an EX of the spectrum of light emitted from the laser.

163. The method of claim 157, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

164. The method of claim 158, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

165. The method of claim 159, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

166. The method of claim 160, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

167. The method of claim 161, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

168. The method of claim 162, further comprising:

the first three dimensional plot provides the solution:

(first output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the second three dimensional plot provides the solution:

(second output) = (a * (calibrating input light known value of FWXM of the spectrum)) + (b* (calibrating input light known value of EX of the spectrum) +c; and

the actual bandwidth calculation apparatus uses the derived equation:

(first actual bandwidth parameter) = ((b * (second output)) – (e * (first output)) + ce – bf) / (bd – ae),

or the equation:

(second actual bandwidth parameter) = ((a * (second output)) – (d * (first output)) + cd – af) / (ae – bd).

169. The method of claim 163, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

170. The method of claim 164, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

171. The method of claim 165, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

172. The method of claim 166, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

173. The method of claim 167, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

174. The method of claim 168, further comprising:

the calibrating input light known value of FWXM is FWHM and the first actual bandwidth parameter is FWHM and the calibrating input light known value of EX is E95 and the second actual bandwidth parameter is E95.

175. The method of claim 169, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some

percentage of the energy of the full spectrum than to the full width at some percent of maximum.

176. The method of claim 170, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

177. The method of claim 171, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

178. The method of claim 172, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

179. The method of claim 173, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.

180. The apparatus of claim 174, further comprising:

the transfer function of the first optical bandwidth detector is selected to be much more sensitive to the full width at some percent of maximum than to the content of the spectrum containing some percentage of the energy of the full spectrum and the transfer function of the second optical bandwidth detector is selected to be much more sensitive to the content of the spectrum containing some percentage of the energy of the full spectrum than to the full width at some percent of maximum.